

SAFE *seating with the strength of steel*

VERSATILE *unit-section construction*

ECONOMICAL *in installation*

PERMANENT *investment value*

plus

complete design flexibility



STEEL GRANDSTANDS by Pittsburgh-Des Moines

*for schools and colleges, municipalities, fairgrounds,
racetracks, industrial athletic fields, ball parks, etc.*



Pittsburgh-Des Moines STEEL GRANDSTANDS

Outstanding Advantages:

SAFE—The first requirement of spectator seating—absolute safety—is met to the full by PDM Steel Grandstands. They conform easily to the most rigid building codes.

KNOWN PHYSICAL FACTORS—No hidden elements. The stand is built of steel with definite, uniform physical properties, to strict applicable codes. Strength and soundness are clearly evident.

STURDY—Steel plates form the deck. Strong steel columns, beams and braces support it, with ample reserve strength for unusual stress conditions.

WATERTIGHT—Weatherproof steel deck permits use of underneath area for dressing rooms, toilets, concessions, storage, etc.

PREFABRICATED—All compo-

nents of stand are factory-fabricated, permitting simple field construction.

UNIT SECTIONS—Unitized design with standard sections enables construction of stands of any size or arrangement, with easy expansion of capacity at any time.

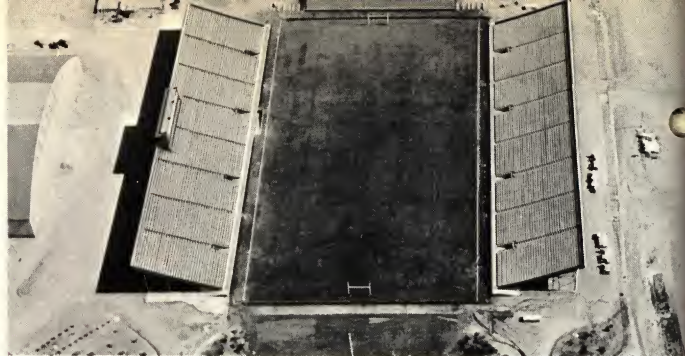
PERMANENCE—The properly-maintained steel stand does not age. It is immune to weather and season—can look like new for a lifetime of service.

ELASTICITY—The steel stand undergoes necessary contraction and expansion without change in steel properties, ideal in severe climatic or earthquake areas.

MOBILITY—PDM Stands are easy to dismantle and re-erect at different locations, when desired.



Interior seating, Field House, Allegheny College, Meadville, Pa.



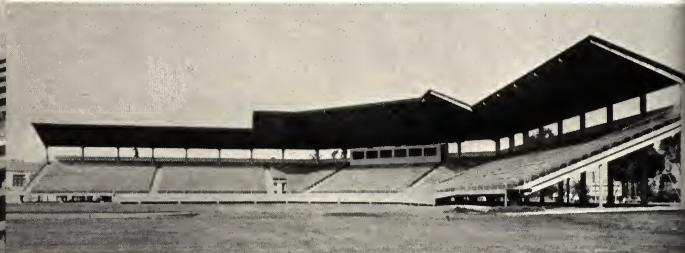
University of Wyoming, Laramie, Wyo., 15,000 seats.



Racetrack Grandstand, Waterford Downs, W. Va. 5,000 seats



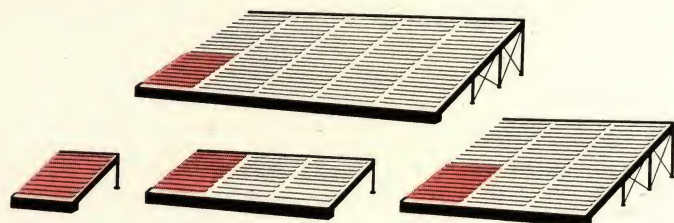
High School Stand, Coraopolis, Pa. 3,600 seats



Covered Baseball Stand, Long Beach, Calif. 3,700 seats



Fairground Stand,
Merced, Calif.
2,600 seats



Basic design factors

With a basic standard unit section 18 feet long and 10 rows deep, your PDM Stand can be any number of sections long by any number of sections deep—individually engineered to fit your layout. Stands can be on one or both sides of the field, horseshoe-shaped, or full oval. Sections may be added at any time to increase capacity in width, depth, or both—always presenting a finished and substantial appearance.

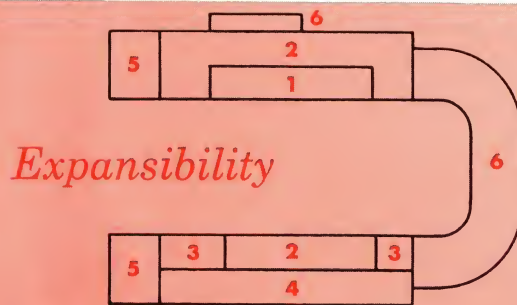
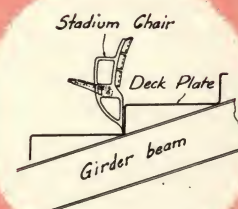
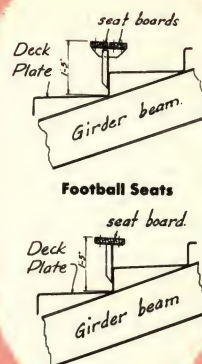


Diagram shows actual 6-step expansion sequence of Pennsylvania State University's PDM Stand from 2400-person capacity in 1934 (1) through additions in 1936 (2), 1937 (3), 1939 (4), 1948 (5) and 1949 (6) to a capacity of 30,000. In 1959-60, the entire structure is being dismantled, moved to a new field and expanded to 45,000 capacity.

Seat spacing and aisle widths

In stadium layout, seat and row spacing must be considered carefully. Leg room must be sufficient, and seat spacing correct for requirements. For bleacher seats, standard *tread width* is 24". When stadium chairs are desired for box seats or baseball, a tread width of 27" to 30" should be used. *Seat width* for bleachers can be 16½" or 18". The narrower width is recommended for mixed adult and children attendance—the 18" width for adults predominately, as in college stands. *Aisles* vary from 3' minimum. *Aisle spacing*: length of rows should not exceed 51' for bleacher seating, nor 36' when chairs are used. *Standard riser* is 8½", consisting of 7½" in riser and 1" tread slope for drainage. Special situations may require greater slopes.

*weathertight steel deck—a bonus value
for economical underdeck development*



Baseball Seat Type



Shower and locker room facilities.



Equipment storage, etc.



Concession stands, telephones, ticket booths.

FOR CALCULATING SEATING CAPACITY—SEE FOLLOWING PAGE

Specification points to check

General—Description of Grandstand, including length, number of rows, and seating capacity desired. Location of site.

Design and workmanship—Design shall be in accordance with the best modern engineering practices. Workmanship shall be equal to the best modern practices, and of such quality as to produce in construction the full strength intended by the designer.

Loadings—The following types of loading must be considered in grandstand design: Dead load. Live load on seats, deck and supporting structures. Sway load (a) in a direction perpendicular to the length of the seats, and (b) in a direction parallel to the length of the seats. Wind load, on a vertical projection of the stand including railings, (a) when stands are fully loaded, and (b) when stands are empty.

Foundations—Give soil conditions. Give depth of frost.

Materials of construction—Steel shall conform to the Standard Specifications of the American Society for Testing Materials (ASTM) and the American Institute of Steel Construction (AISC) for buildings and other structural steel. Give minimum thickness of components. Lumber for seat boards shall be white oak, or vertical grain quarter-sawn fir lumber, finished two sides and two edges with "eased" top corners. Other material shall be suitable, of uniform quality, and without defects affecting the strength or service of the grandstand.

Allowable Stresses—All steel components of the structure shall be so proportioned that the stress shall not exceed the value set forth in the AISC Specification. Other materials where used shall be so designed and proportioned that their stresses shall not exceed the allowable unit stresses generally accepted as safe by engineering practices.

Special Requirements—The grandstand shall be of solid steel deck plates supported by steel girders, columns and bracing. Deck

plates shall be flanged or bent into steps for stiffness and shall be shingle-lapped and bolted or welded to make the deck weather tight. The treads shall be not less than 24" wide and sloped for drainage. Height of riser shall be not less than 7". The seat lumber shall be securely bolted to steel pedestal supports spaced about 4'6" center to center. The seat height shall be 17" above steel treads. A steel apron plate shall be provided along front of stand extending from front treads down to within 4" of the ground. One steel flashing plate shall be provided for each end of stand and each side of wells. These plates shall be attached to deck plates to conceal both the girders and the end of deck plates.

Hand Rails—Hand rails conforming to local safety codes shall be provided along the front, both ends and the rear of the stand, and for ramps, stairs and wells.

Aisles—consult local building codes. Spacing of aisles (a) seats without backs, (b) seats with backs. Width of aisles. Distance between seats: the horizontal distance back-to-back of seats shall be not less than 24".

Welds—shall be made only by operators who have been previously qualified by test, as prescribed in the "Standard Qualification Procedure" of the American Welding Society to perform the type of work required, except that this provision need not apply to tack welds not later incorporated into finished welds carrying calculated stress.

Painting—The paint shall consist of two coats applied to all surfaces and one additional coat on top of deck of stand. The first coat shall be applied at place of manufacture. During the application of the first field coat clean white silica sand shall be applied to top of deck. After this paint has dried the excess sand shall be removed by sweeping or blowers and an additional coat of paint applied.

Pittsburgh-Des Moines Steel Grandstands

Pittsburgh-Des Moines Steel Deck Grandstands

HOW TO CALCULATE SEATING CAPACITY

A standard unit or section of PDM Steel Deck Grandstand is 18'-0" long by 10 rows (20 feet) deep. In calculating seating capacity of a grandstand due allowance must be made for the space required for aisles, wells, etc. It is therefore assumed that, as an average, only 16'-6" of the 18'-0" length of each bay will be used for seating. Thus, with 16½" allowed per seat, each standard section will have 120 seats. If 18" are allowed per seat, each standard section will have 110 seats. The seating capacity of a straight stand may, therefore, be calculated as follows:

FOR 16½" SEAT WIDTH

Number of seats=length of stand in feet x number of rows x (12/18)

FOR 18" SEAT WIDTH

Number of Seats=length of stand in feet x number of rows x (11/18)

The seating capacities listed in the following table are based on 16½" seat widths. If the stand is to be laid out for 18" seats, the seating capacities listed in the table are reduced by 8⅓ percent.



All-steel press box.



Sturdy steel deck.



Protected, rubbish-free underdeck area.

CAPACITY TABLES FOR VARIOUS STAND LENGTHS AND DEPTHS

Length of Stand—in Feet.....		18' 0"	36' 0"	54' 0"	72' 0"	90' 0"	108' 0"	126' 0"	144' 0"	162' 0"	180' 0"
Depth of Stand	10 Rows (20' 0")....	120	240	360	480	600	720	840	960	1080	1200
	20 Rows (40' 0")....	240	480	720	960	1200	1440	1680	1920	2160	2400
	30 Rows (60' 0")....	360	720	1080	1440	1800	2160	2520	2880	3240	3600
	40 Rows (80' 0")....	480	960	1440	1920	2400	2880	3360	3840	4320	4800
	50 Rows (100' 0")....	600	1200	1800	2400	3000	3600	4200	4800	5400	6000
	60 Rows (120' 0")....	720	1440	2160	2880	3600	4320	5040	5760	6480	7200
Length of Stand—in Feet.....		198' 0"	216' 0"	234' 0"	252' 0"	270' 0"	288' 0"	306' 0"	324' 0"	342' 0"	360' 0"
Depth of Stand	10 Rows (20' 0")....	1320	1440	1560	1680	1800	1920	2040	2160	2280	2400
	20 Rows (40' 0")....	2640	2880	3120	3360	3600	3840	4080	4320	4560	4800
	30 Rows (60' 0")....	3960	4320	4680	5040	5400	5760	6120	6480	6840	7200
	40 Rows (80' 0")....	5280	5760	6240	6720	7200	7680	8160	8640	9120	9600
	50 Rows (100' 0")....	6600	7200	7800	8400	9000	9600	10200	10800	11400	12000
	60 Rows (120' 0")....	7920	8640	9360	10080	10800	11520	12240	12960	13680	14400

The wide experience of our grandstand engineers in solving outdoor seating problems is at your service upon request—from counsel in site selection, through general design of stand and field layout, to the details of accessory and auxiliary installations. Write or telephone our nearest office.



Pittsburgh-Des Moines Steel Company

Plants at PITTSBURGH, BALTIMORE, DES MOINES, SANTA CLARA, FRESNO and STOCKTON, CALIF.

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